Accessing and Using Existing Data for Public Health: Traditional and Non-traditional Sources

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Introduction

- Who are We?
- Overview of the SC Data Warehouse
- Development of Web-based "Cubes"
- Development of the Client Information System
- How Environmental Research Can Benefit from Integrated Data

Who Are We?

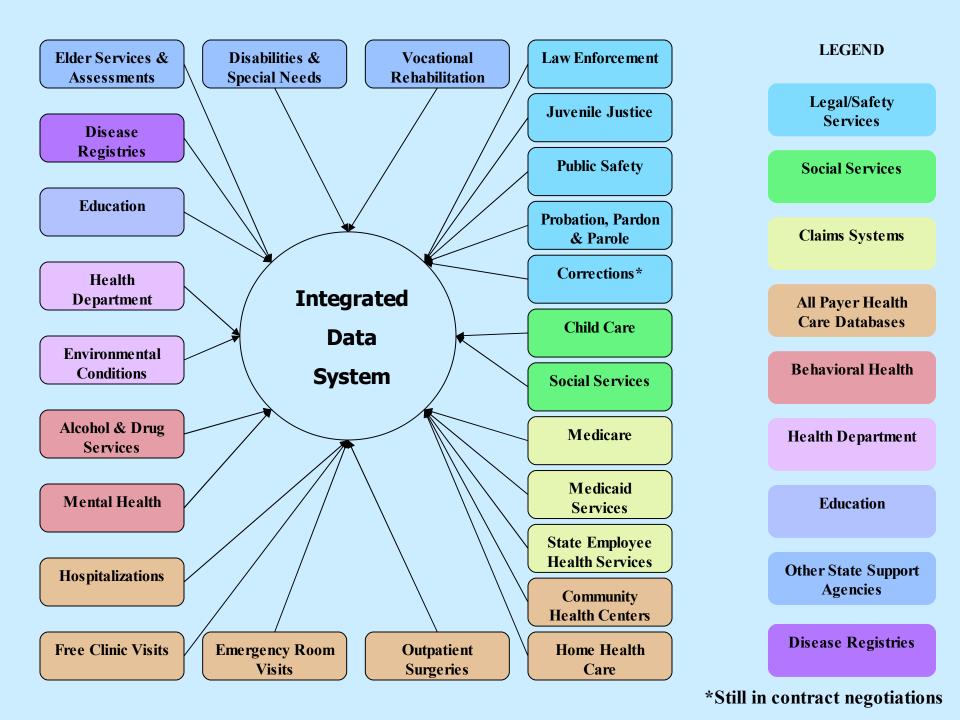
- SC Budget and Control Board, Office of Research
 & Statistics is a Service Agency in South Carolina
- Neutral, no programmatic responsibilities
- Statistical and Research focused
- Experienced in gathering, integrating, and disseminating data

SC Data Warehouse

- Build off of existing systems (legacy systems from state agencies and private sector)
- Create a Unique ID (not related to any other number)
- Identifiers are pulled off of the statistical data. Use only the statistical data
- Data is always "owned" by the originating agency.
 Must have permissions to use and/or link any data

Factors Supporting Successful Development of an Integrated Database

- Neutral Agency (preserving the balance of power)
- Able to support public, private, not for profit and research communities
- Agencies agree on critical issues of data use and release
- Equal access through an established approval process
- Expertise in state-of-the-art technology, security and confidentiality



Using Data in the Data Warehouse Agencies & Other Entities can:

- Evaluate their programs
- Look at Outcomes
- Understand better how their programs interact with other agency & other entity programs
- Study Health, Human Service, Education, and Law Enforcement Issues
- Analyze Statistical Aggregate Information
- Access Analytic Data Cubes
- Partner in the Development of Customized Software Applications

What is a Cube?

 While ORS answers requests now using information from the Data Warehouse, our dream was to create a

- "WEB-Accessible User-Driven Query Based System that agencies can access and explore their own questions"
- Cubes would be for statistical/aggregate analyses

What Is an Analytic Cube?

- A way to "slice and dice" through large amounts of data
- Define "slicers," characteristics that are important to analyzing the subject population
- Pre-aggregate the linked data by all possible combinations of "slicers"

Software

- Fact tables created in SAS
- Loaded into Microsoft SQL Server
- Cube Created Using "Analysis Services" (a tool in SQL Server)
- Retrieval from Cube and Web Interface Using "Panorama" (Nova View)
- Secure Web Access Using User and Work Station Certificates

Example of Existing Cube

- Linked data sets for
 - Hospital delivery record of mother
 - Hospital birth record of infant
 - All pre-natal hospitalizations and ED visits of the mother

"Slicers" Currently Used in the Mother/Baby Cube SC Data Warehouse April 22, 2004

Month/Quarter/Year of Birth

Age of Mother

Race of Mother and Baby

Birth Outcome (Healthy, Died, LBW, VLBW, Full-term with Chronic problem, Other Problem)

Birth Weight

Maternal Risk Factors (from ICD-9-CM codes found on medical records)

- Amniotic Infection
- •Anemia
- •Asthma
- Diabetes (chronic and gestational)
- •Fetopelvic Disproportion
- •Eclampsia/Pre-eclampsia
- •Hemorrhage
- •Hypertension
- •Malposition of Fetus
- •Mental Disorder
- •Placenta Previa
- •RH Factor
- •Premature Rupture of Membranes
- •STD

"Slicers" Currently Used in the Mother/Baby Cube SC Data Warehouse April 22, 2004

- Substance Abuse
- Threatened Labor
- Tobacco Use
- •Trauma
- •UTI
- •Vaginitis/PID
- Viral/Bacterial Infection
- •Vomiting

Number of Maternal Risks Found

Body Mass Index (WIC Clients Only)

Baby's Health Condition at Birth (from ICD-9-CM codes found on medical records)

- *Drill-down to major groupings
- •Drill-down to specific chronic conditions within major groupings

Geographic Location of Residence at Time of Delivery

- **•**Drill-down from region/district to county
- •Drill-down from county to zip code
- •Environmental factors (lead, air, water, etc.) at time of delivery and during prenatal care

"Slicers" Currently Used in the Mother/Baby Cube SC Data Warehouse April 22, 2004

Number of Maternal Postnatal ER Visits (within 30 days of delivery)

Number of Maternal Postnatal Inpatient Hospitalizations (within 30 days of delivery)

Family Support Services (Medicaid Moms only)

Family Planning Services (Medicaid Moms only) Education of Mother

Expected Pay Source (Medicaid, Commercial Insurance, Self Pay, Other)

Months Between End of Last Pregnancy and Start of This Pregnancy

Number of Previous Pregnancies

Kessner Adequacy of Prenatal Care

Trimester in Which Prenatal Care Began

Method of Delivery

Perinatal Level of Hospital

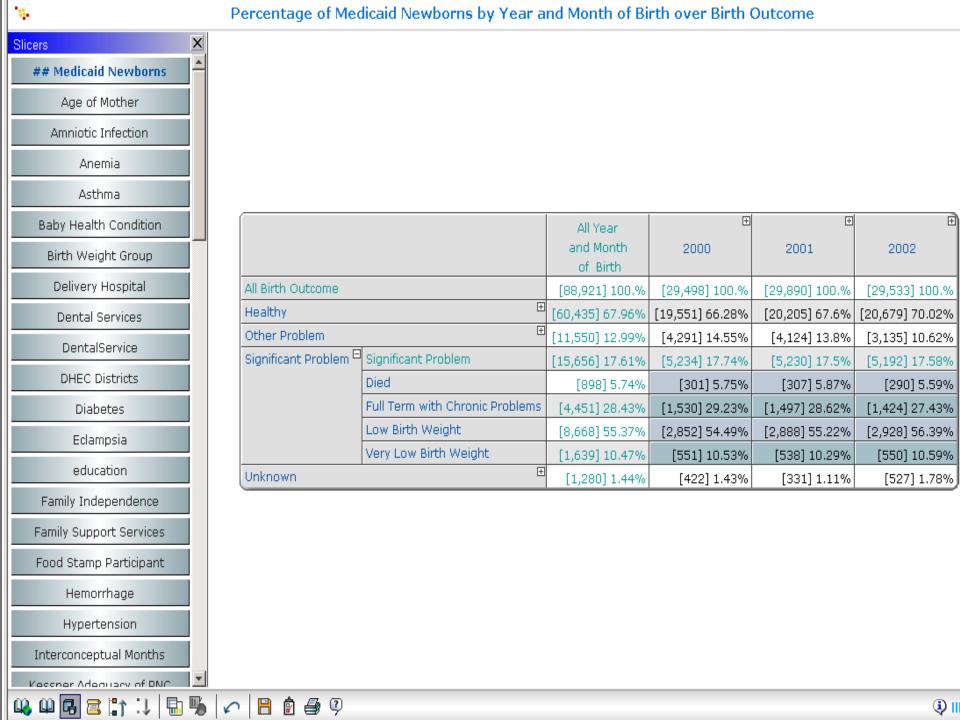
Specialty of Delivering Physician

Participant in TANF (temporary assistance to needy families)

Participant in Food Stamps

Number of Prenatal ER Visits

Number of Prenatal Inpatient Hospitalization



Percentage of Medicaid Newborns by Race over Eclampsia and Birth Outcome

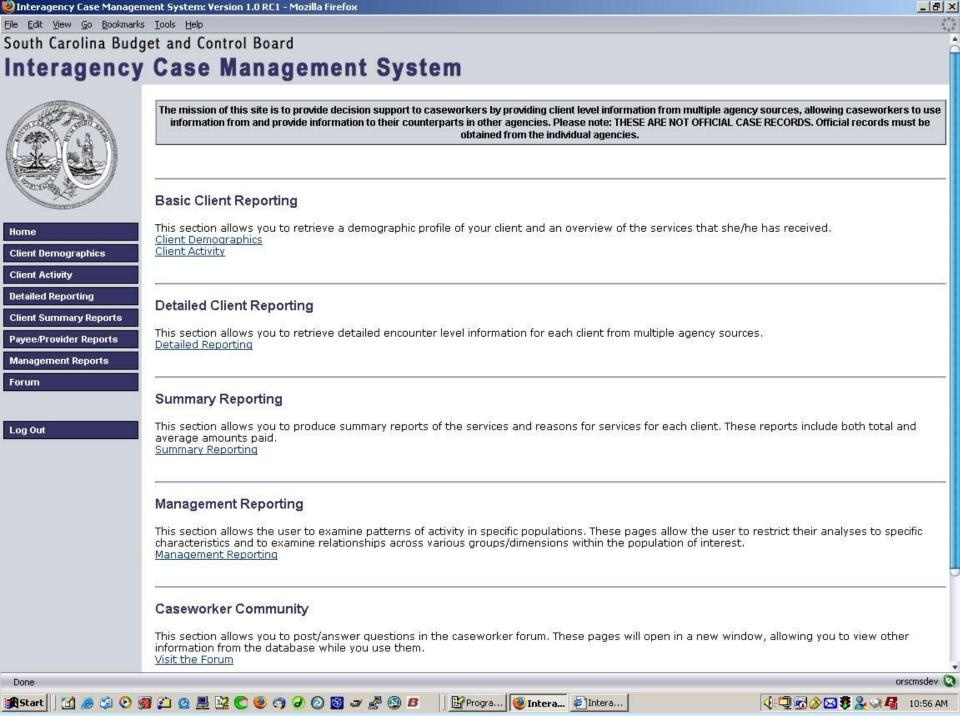
		White	African American	Hispanic	All Race
All Eclampsia	All Birth Outcome	[36,349] 100.%	[43,525] 100.%	[5,277] 100.%	[88,921] 100.%
	Healthy ⊕	[26,285] 72.31%	[28,723] 65.99%	[3,884] 73.6%	[60,435] 67.96%
	Other Problem 🕀	[4,591] 12.63%	[5,808] 13.34%	[750] 14.21%	[11,550] 12.99%
	Significant Problem 🖰	[5,007] 13.77%	[8,315] 19.1%	[558] 10.57%	[15,656] 17.61%
	Unknown ⊕	[466] 1.28%	[679] 1.56%	[85] 1.61%	[1,280] 1.44%
Eclampsia Found	All Birth Outcome	[1,506] 100.%	[2,065] 100.%	[146] 100.%	[3,747] 100.%
	Healthy ⊕	[891] 59.16%	[1,041] 50.41%	[77] 52.74%	[2,026] 54.07%
	Other Problem 🕀	[228] 15.14%	[271] 13.12%	[32] 21.92%	[536] 14.3%
	Significant Problem 🖰	[371] 24.63%	[729] 35.3%	[33] 22.6%	[1,141] 30.45%
	Unknown ⊕	[16] 1.06%	[24] 1.16%	[4] 2.74%	[44] 1.17%
Eclampsia NOT Found	All Birth Outcome	[34,843] 100.%	[41,460] 100.%	[5,131] 100.%	[85,174] 100.%
	Healthy ⊕	[25,394] 72.88%	[27,682] 66.77%	[3,807] 74.2%	[58,409] 68.58%
	Other Problem 🕀	[4,363] 12.52%	[5,537] 13.36%	[718] 13.99%	[11,014] 12.93%
	Significant Problem 🖰	[4,636] 13.31%	[7,586] 18.3%	[525] 10.23%	[14,515] 17.04%
	Unknown ⊞	[450] 1.29%	[655] 1.58%	[81] 1.58%	[1,236] 1.45%

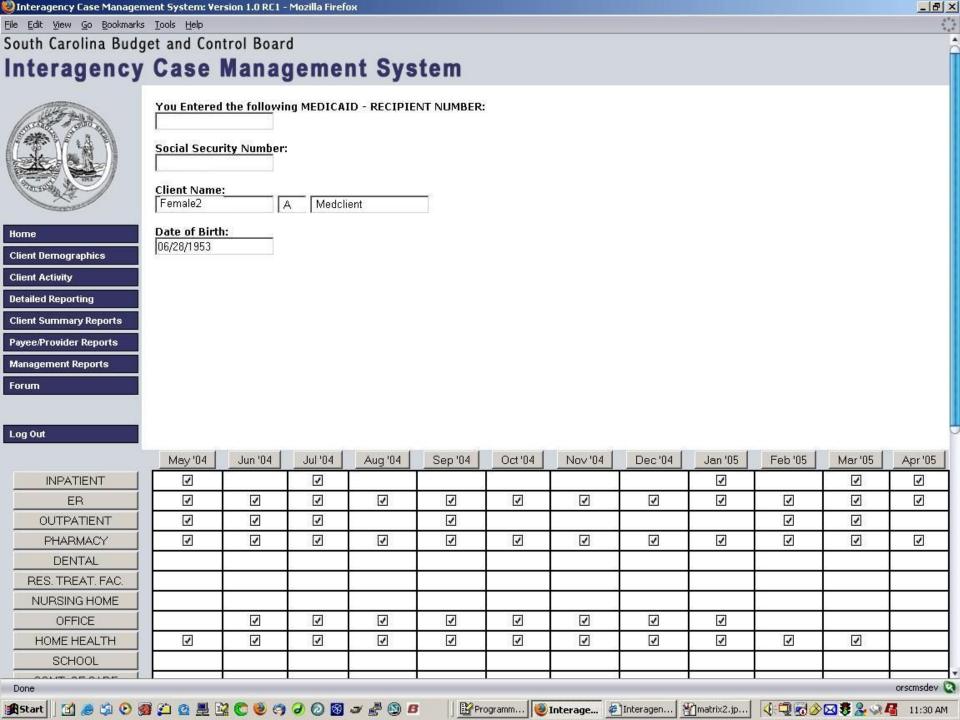
Other Cubes Under Development

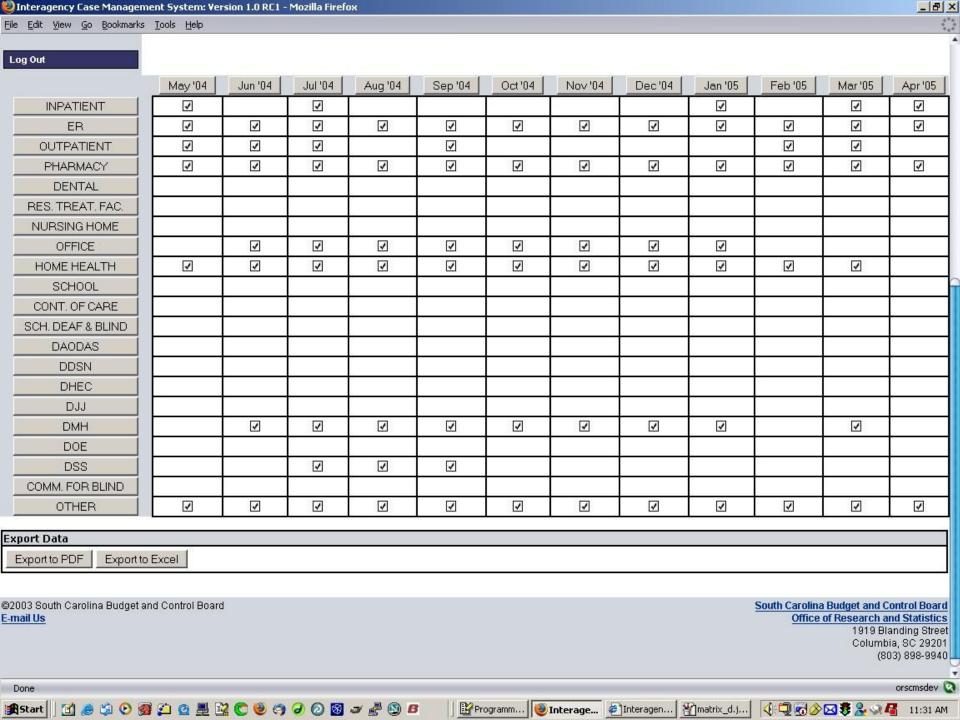
- Injury Cube (funded through a CDC grant)
- Mental Health/Alcohol Cube funded through DMH funds
- Medicaid Cube (all ages)
- Elderly Cube (just received funding to development this cube)

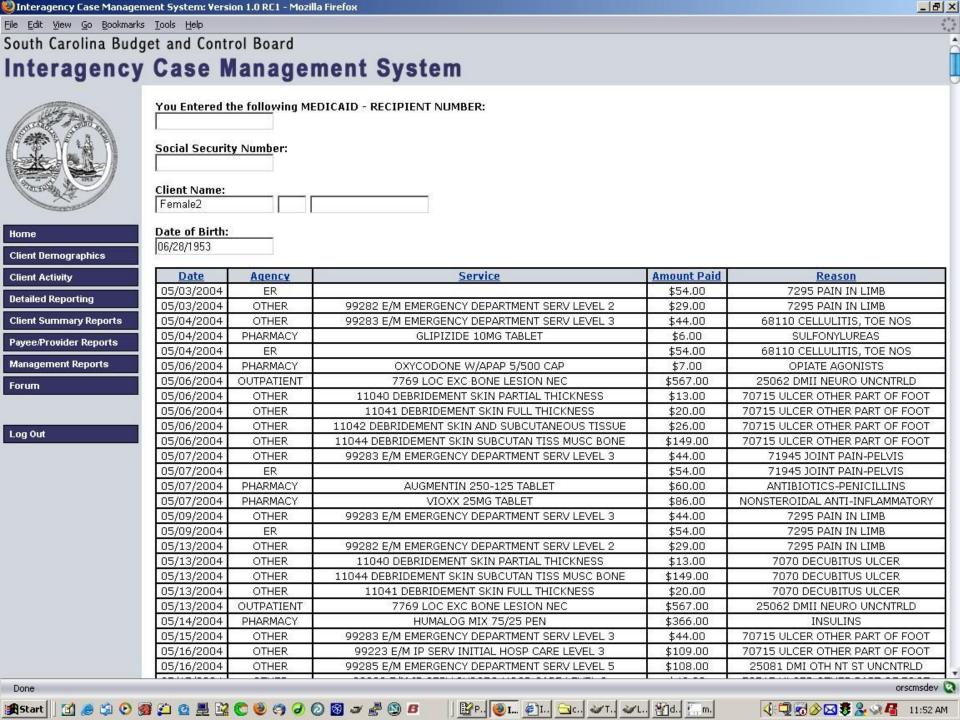
The Client Information System

- Web-based HIPAA compliant secure Client Information system which tracks South Carolina public sector clients and their services across multiple agencies.
- For <u>Treatment and Operations</u>
- Designed to provide a 12-month rolling history of the client's services.
- Includes management and summary reports.
- First phase are Medicaid clients served by the Dept. of Health and Human Services. (Now Operating)
- Discussions with two other Agencies have begun
- Legal teams involved
- End product will allow the tracking of SC public sector clients across multiple agencies to ensure better coordination and management.

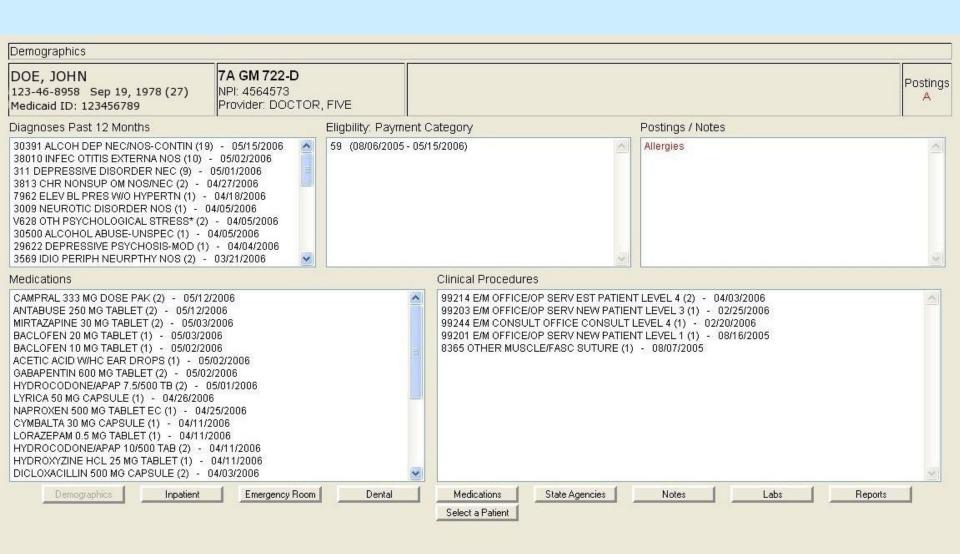








Interagency Case Managem	ent System: Vers	sion 1.0 RC1 - Mozil	a Firefox			<u> </u>		
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	03/24/2005	OUTPATIENT	11	04 1104	\$273.00	25062 DMII NEURO UNCNTRLD		
	03/24/2005	OTHER	11040 DEBRIDEMENT	SKIN PARTIAL THICKNESS	\$26.00	70714 ULCER OF HEEL & MIDFOOT		
	03/24/2005	PHARMACY	OXYCODONE	W/APAP 5/500 CAP	\$7.00	OPIATE AGONISTS		
	03/27/2005	HOME HEALTH	A4253 BLOOD GLUCOSE	STRIPS/TABS PER BOX OF 50	\$72.00	7070 DECUBITUS ULCER		
	03/27/2005	HOME HEALTH	A4245 ALCOHOL WIPES, PER BOX OF 100		\$15.00	7070 DECUBITUS ULCER	\neg	
	03/27/2005	HOME HEALTH	A4259 LANCETS, PER BOX OF 100		\$12.00	7070 DECUBITUS ULCER	- 3	
	03/28/2005	PHARMACY	HUMALOG MIX 75/25 PEN		\$392.00	INSULINS		
	03/29/2005	OTHER	99233 E/M IP SERV SUBSEQ HOSP CARE LEVEL 3		\$55.00	25003 DMI WO CMP UNCNTRLD		
	03/30/2005	OTHER	99233 E/M IP SERV SUBSEQ HOSP CARE LEVEL 3		\$55.00	25003 DMI WO CMP UNCNTRLD	\neg	
	03/31/2005	INPATIENT			\$3287.00	2765 HYPOVOLEMIA	- 3	
	03/31/2005	OTHER	99252 E/M CONSULT INITIAL IP CONSULT LEVEL 2		\$53.00	70715 ULCER OTHER PART OF FOOT	58	
	03/31/2005	OTHER	99232 E/M IP SERV SUBSEQ HOSP CARE LEVEL 2		\$40.00	25003 DMI WO CMP UNCNTRLD	- 2	
	04/04/2005 ER		\$54.00	7906 ABN BLOOD CHEMISTRY NEC	\neg			
	04/04/2005	OTHER	99283 E/M EMERGENCY	DEPARTMENT SERV LEVEL 3	\$44.00	25000 DMII WO CMP NT ST UNCNTR		
	04/04/2005 PHARMACY LEVAQUIN 250 MG TABLET		\$111.00					
	04/04/2005	OTHER	11040 DEBRIDEMENT SKIN PARTIAL THICKNESS		\$26.00	70715 ULCER OTHER PART OF FOOT	ž.	
04/04/2005 OTHER		11040 DEBRIDEMENT	SKIN PARTIAL THICKNESS	\$0.00	70715 ULCER OTHER PART OF FOOT	-52		
	04/06/2005	ER			\$115.00	7806 FEVER	- 3	
		OTHER	99283 E/M EMERGENCY	DEPARTMENT SERV LEVEL 3	\$44.00	5990 URIN TRACT INFECTION NOS		
		PHARMACY	LEXAPRO	10 MG TABLET	\$69.00	ANTIDEPRESSANTS		
	04/08/2005	OTHER	99283 E/M EMERGENCY DEPARTMENT SERV LEVEL 3		\$44.00	25081 DMI OTH NT ST UNCNTRLD	П	
04/08/200		OTHER	HER 99253 E/M INITIAL IP CONSULT LEVEL 3		\$71.00	70715 ULCER OTHER PART OF FOOT	3 3	
	04/08/2005	PHARMACY	OXYCODONE W/APAP 5/500 CAP		\$1.00	OPIATE AGONISTS	- 0	
	04/11/2005	INPATIENT			\$2661.00	25083 DMI OTH UNCNTRLD		
	04/15/2005	OTHER	99283 E/M EMERGENCY DEPARTMENT SERV LEVEL 3		\$44.00	7295 PAIN IN LIMB	\Box	
	04/19/2005	OTHER	99283 E/M EMERGENCY DEPARTMENT SERV LEVEL 3		\$44.00	7295 PAIN IN LIMB		
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Potential of an Integrated Database for Environmental Health Research and Surveillance

- Integrated Database may be geo-coded
- Overlay environmental data such as air quality and water quality either at the geographic level or the individual level
- Use the power of full claims-based systems (have both a numerator and denominator) to relate health and other problems to environmental quality
- Can attach environmental measures (air pollution counts, water chemicals, etc.) to individual records for provider use in health care

Potential of an Integrated Database for Environmental Health Research and Surveillance (Continued)

 With the added power of the integrated database, controls can be made for:

Poverty

Race

Behavioral Health

Disabilities, etc.

Environmental conditions

We all have the same type of data

We choose to cooperate differently